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ART. I.—*Clinical Report on Pneumonia, based on an analysis of one hundred and thirty-three Cases.* By AUSTIN FLINT, M. D., Professor of Clinical Medicine and Pathology in the New Orleans School of Medicine, and in the Long Island College Hospital.

MY clinical records, for the last twelve years, embrace one hundred and thirty-three cases of pneumonia, exclusive of cases in which the patients were under five years of age. I propose to analyze this collection of cases with reference to certain points of inquiry. I shall not undertake to examine and compare the histories, as regards the symptomatic phenomena which belong to the disease. The researches of Grisolle have rendered this labour, in a measure, uncalled for; at all events, the same amount of labour might be more profitably bestowed upon other diseases, which, as yet, have been very imperfectly studied by means of the analytical method. Nor shall I direct my inquiries to the physical signs of this disease. The physical signs, in a large proportion of the cases, were recorded with much minuteness; and with special reference to these, a considerable number of the histories have been already analyzed, in the preparation of a work on physical exploration.¹ Moreover, the analysis of so large a collection of cases, with reference to the symptoms and signs, would extend this paper beyond the limits to which it must be restricted. My plan is to interrogate the histories, with reference to the laws of the disease, as regards the ages, occupations, and habits of the patients, the circumstances connected with its causation, the situation and extent of the local affection, the com-

¹ Physical Exploration, and the Diagnosis of Diseases affecting the Respiratory System. Blanchard & Lea, 1856.

plications of the disease, its intrinsic tendency to death or recovery, etc. ; and to endeavour to develop information bearing on the indications for treatment. A large number of the cases were observed in a northern city, viz. Buffalo, N. Y. ; and a large number were observed in a southern city, viz. New Orleans. A few of the cases were observed at an intermediate point, viz. Louisville, Ky. Does the disease present marked variations, as regards its important laws, in these widely separated situations ? Are the indications for treatment similar in New Orleans, Buffalo, and Louisville, or does the treatment require to be modified in places which represent the northern, southern, and middle portions of our country ? These are interesting questions, and important also in a practical point of view. I shall be glad, if the results of my analysis should prove of any value, as data upon which the answers are to be based. It is plain, that the questions can be answered only by comparing the histories of cases recorded in the different situations. Mere speculation, or general impressions, are of little value, and are as likely to lead to error as to truth. Irrespective of modifications which may be derived from climate, the treatment of pneumonia has of late been the subject of much discussion, and is invested with an importance greater than belongs to the disease itself, inasmuch as it involves the principles which are to govern the treatment of acute inflammations in general.

Preparatory to the analysis, I have made abstracts of the histories of all the cases. These abstracts are before me, and I shall proceed to interrogate them. They are arranged in four classes, viz : 1st. *Forty-nine* cases observed in the Buffalo Hospital of the Sisters of Charity, from August, 1848, to June, 1859 ; 2d. *Fifty-three* cases observed in the New Orleans Charity Hospital, during the winters of 1858-9 and 1859-60 ; 3d. *Eleven* cases observed in the Louisville Marine Hospital, during the winters of 1853-4 and 1855-6 ; 4th. *Twenty* cases observed in private practice, from January, 1851, to May, 1860. Nearly all the cases included in class 4, were observed at Buffalo. With respect to certain points of inquiry, I shall institute comparisons between the cases belonging to these four classes.

The propriety of at least two subdivisions is obvious. Cases of simple pneumonia are to be separated from the cases in which this disease is complicated with other serious affections. With respect to some points of inquiry, these two classes of cases are to be interrogated separately. It is plain, that a collection of cases, in which the disease is uncomplicated, can alone furnish the data for determining the natural history of the disease, its intrinsic tendencies, the principles of treatment which belong to it *per se*, etc. An analysis of a collection, in which complicated and uncomplicated cases were mingled together, would furnish results leading to erroneous practical conclusions. The propriety of studying fatal and non-fatal cases separately, and making comparisons with regard to certain points, is apparent. This will be the ground of another subdivision.

The points of inquiry, to which attention will be first directed, relate to age, sex, occupation, habits, other circumstances connected with the causation of the disease, and the comparative frequency of the disease in the different situations in which the cases were observed.

Analysis with reference to Age, Sex, Occupation, Habits, Causation, and the comparative frequency of Cases of the Disease, in New Orleans, Louisville, and Buffalo.

Age.—The ages were noted in 121 cases. In three cases, the ages were under 10 and over 5 years. Two of these three cases were in private practice. Few patients were received into hospital under the age of ten years, and as all but twenty were hospital cases, it is evident, that in this collection, the proportion of cases in which the disease occurs under ten years of age is not fairly represented. The same remark is measurably applicable to the cases in which the ages were between 10 and 20 years. The proportion of hospital patients, between these ages, is much less than of those over 20; so that the liability to the disease, during that period of life, is not fairly represented by the number of patients over 10 and under 20, in this collection. The number is 13. The number of cases in which the ages were between 20 and 30 years is the largest, viz. 44. The number between the ages of 30 and 40 years is 37. The number between 40 and 50 years, 17; and between 50 and 60 years, 7. There was not a single instance of a patient over 60. Making due allowance for the periods of life, in which persons are most likely to resort to hospitals, and to the relative number of living persons of different ages, the inference to be drawn from these statistics, as to the existence of a predisposition to pneumonia, peculiar to any of the foregoing decades, is negative. The liability to the disease, in childhood, adolescence, early manhood, middle life, and old age, is probably not very far from uniform; at all events, the number of cases occurring at different ages is sufficient to show, that no period of life is exempt from it. The comparatively small number of persons over 60 living, and the few persons, so old as this, received into hospitals, will account for there being no patients over that age. The statistics of others show that pneumonia occurs after 60.¹ I do not embrace in my collection cases under five years of age. This is not because I have not the records of such cases. Lobar pneumonia occurs in infancy, as well as the so-called lobular pneumonia; the propriety of considering the latter as a variety of pneumonia having been rendered more than doubtful by late researches, I have excluded cases in which the ages were under five years, in order to avoid discussion of a mooted question in pathology.

Sex.—My service at the Charity Hospital, in New Orleans, embraces male wards only; but in the hospitals at Buffalo and Louisville I had charge of both male and female wards. Of the 80 cases observed in the

¹ *Traité pratique de la Pneumonie, etc.* Par A. Grisolle. Paris, 1841, p. 100.

latter hospitals and in private practice, 10 were females. This illustrates the much greater frequency of pneumonia in the male than in the female sex.

Occupation.—The occupation was noted in 87 cases, exclusive of the female patients. In 52 of these cases, the patients were labourers. In the remaining 35 cases, a variety of occupations were represented. It is important to enumerate them with reference to a general conclusion: Boatmen or seamen, 5; blacksmiths, 3; medical students, 3; gardeners, 9; clerks, 2; machinists, 3. Seventeen different callings had but a single representative, as follows: Sign painter, common painter, barkeeper, steamboat pilot, baker, steward, last-maker, draper, peddler, joiner, moulder, storekeeper, male nurse, milkman, farmer, plasterer, and merchant.

The calling of a labourer includes a great variety of out-door work. Muscular exertion and exposure to the weather are its distinctive characteristics. A large proportion of male patients received into hospitals with all diseases, are labourers; but if these were in any measure rendered exempt from pneumonia by their calling, they would not constitute so large a proportion of the patients affected with the disease. In fact, the large proportion (50 out of 87) must be considered as showing that, as a class, they are particularly prone to the disease. The occupations in the remainder of the cases are generally of a kind to involve, more or less, exposure to the weather. Various sedentary occupations, and those which confine within doors, such as shoemaking, tailoring, etc., are not represented. This would not be so, if such occupations favoured a predisposition to the disease. An analysis of these cases leads to the conclusion that persons are most liable to pneumonia who are exposed to the vicissitudes of the weather, and, *per contra*, that in-door occupations afford, in a measure, security against the disease.

Habits.—The histories of many of the cases are defective as regards intemperance, and nearly all are deficient in an account of habits in other respects. In 37 cases, it is noted that the patients were either temperate or intemperate, or addicted to moderate drinking. Of these 37 cases, in only 6 were the patients temperate; in 25 they confessed that they were intemperate; and in 6 they were moderate drinkers. In 10 cases the attack of pneumonia followed excessive drinking, or a debauch.

Allowance is to be made for the fact, that a large majority of male patients with all diseases in the hospitals where my cases were chiefly collected, are either intemperate or moderate drinkers, and much oftener the former than the latter. But we are warranted, in concluding from the very small numbers of patients with pneumonia, who asserted that they were temperate, that the abuse of alcohol leads to the development of the disease. This conclusion is strengthened by the fact, that, in nearly one-quarter of the cases analyzed with reference to this point, the disease was preceded by excessive indulgence. It is a question, however, whether the

abuse of alcohol acts directly as a cause, or whether the development of the disease may not be due, in a great measure, to circumstances incidental to intemperance, such as exposure to cold, &c.

Causation.—The previous points of inquiry, relating to age, sex, habits, and occupation, in fact, have reference to the causation of the disease. Under the present caption I wish to include other circumstances connected with the development of the disease, which may be supposed to stand in a causative relation to it. I shall, therefore, interrogate the histories with regard to any affections which may have preceded or accompanied the attack of pneumonia, and with regard to any unusual exposure or injury to which the disease may be attributable. But, with respect to particular circumstances bearing on the causation, many of the histories are defective. This arose often from an indisposition to push interrogatories into much detail in consequence of the suffering and weakness of the patients; in other cases, from the difficulty of obtaining clear and reliable statements from hospital patients, and, finally, from want of time and patience on the part of the recorder.

The connection of pneumonia with periodical fever is the first point of inquiry which suggests itself. In each of the hospitals in which the greater part of the cases in this collection were observed, a large proportion of the patients, received with different diseases, had been exposed to malaria, and cases of intermittent fever were abundant. In 13 cases the histories state that the patients with pneumonia had been more or less affected previously with intermittent fever. I presume that the number was considerably larger than this, pains not being taken to note the fact in all the histories. Of these 13 cases, in 3 it is simply stated that the patients were subject to intermittent; in 1 case the patient had suffered much of the time with intermittent fever in the preceding ten months; in 1 case the patient had recovered from an attack three weeks before, and in 1 case a week before; in 1 case the interval was some months; in 5 cases the development of the pneumonia was immediately preceded by the intermittent; but in 1 case only was the patient actually suffering from intermittent fever, when the pneumonia became developed. In no case did a relapse of intermittent occur while the pneumonia was in progress.

These facts certainly do not go to show any pathological connection between pneumonia and periodical fever. It may fairly be doubted, whether persons subject to intermittent fever, are thereby more prone to pneumonia. It is even probable, that a person, during the continuance of the paroxysms of an intermittent fever, is less likely to be attacked by pneumonia than after the paroxysms are interrupted, since, in several instances, the pneumonia followed closely on the heels of an intermittent fever, and in only one case was the pneumonia developed while the intermittent fever continued. Nor does this analysis present grounds for supposing that pneumonia tends to reproduce an attack of intermittent fever in persons subject

to relapses of the latter disease, since in not a single instance in the present collection of cases, did this occur.

That intermittent fever and pneumonia may coexist is certain. I have observed these two affections combined. We can understand that, at certain times and places, both diseases being prevalent, the combination may not unfrequently occur, and the most rational view is, when this is observed, that neither predisposes to the other, but that the coexistence is due merely to the coincidence of the causes proper to each.

Do other pulmonary affections involve a predisposition to pneumonia? In 13 cases the pneumonia was preceded by some other pulmonary affection. I presume that these cases embrace nearly all in which this was the fact. In a few of these cases (or, to be explicit, in 4) the attack was preceded simply by cough and other symptoms denoting only bronchitis. In 3 cases a previous attack of pneumonia had occurred within a short period. In one of these 3 cases the patient had recovered from pneumonia, and been discharged, thirteen days prior to his returning with the second attack; and the inflammation in the second attack was seated in a different lobe (the upper) of the lung opposite to that affected in the first attack; this case proved fatal. In another case the upper lobe was affected in the second attack, and the lower lobe of the same lung in the first attack; the interval between the two attacks is not precisely noted, but it was short. In the remaining case the patient had pneumonia two months before the second attack, the whole right lung having been affected, and in the second attack the lower lobe of the same lung was affected; this patient recovered. In 7 cases the patients were affected with pulmonary tuberculosis. The pneumonia in one of these cases was seated in the lower lobe of the left lung, while the deposit of tubercle was chiefly at the summit of the right lung. In one case the pneumonia was seated in the upper lobe in which the deposit of tubercle was seated. In the other cases, save one, the existence of tubercle is predicated on long continued cough, hæmoptysis, loss of weight, etc., the physical signs not been noted in the histories. In one case the lungs after death were found crammed with miliary tubercles. In all the cases, save this one, the patients recovered from the pneumonia.

These are all the facts relating to antecedent pulmonary disease. They show that bronchitis does not tend to eventuate in pneumonia. They show that after a patient has fairly recovered from an attack of pneumonia, there is not much liability to a speedy recurrence of the disease. They show that patients affected with pulmonary tuberculosis are not particularly prone to an attack of pneumonia; and that when it does supervene, it may or may not affect the upper lobe in which the deposit of tubercle is most abundant, and that the coexistence of tubercle and pneumonia does not render the disease fatal. Finally, the absence of other pulmonary affections, such as emphysema, chronic pleurisy, asthma, shows that these affections do not

involve a predisposition to pneumonia, but, on the other hand, it is probable they may afford protection against the disease.

Delirium tremens preceded the disease in 3 cases. In one case the patient had been discharged ten days before being readmitted with pneumonia, and in another case but two days. In the remaining case the patient entered with delirium tremens, and the pneumonia was subsequently developed. As will be seen in another connection, delirium tremens was a complication of the pneumonia in a number of instances.

In two cases the patients were affected with organic disease of the heart. In one of these cases death occurred during the first stage of the pneumonia; the other patient recovered.

The affections which preceded the pneumonia in other cases were, conjunctivitis in 3 cases; dysentery in 1 case; diarrhœa in 1 case; ecthyma and subacute laryngitis in 1 case.

In 3 cases the pneumonia was traumatic, following, in 2 cases, a severe injury to the chest, the ribs being fractured in 1 case; and in the remaining case, following the passage of a pistol ball through the chest.

The analysis of these cases thus affords no evidence of the dependence of pneumonia on any antecedent affections seated in the lungs or elsewhere. It is to be borne in mind, however, that cases are not included in this collection in which the pneumonia was developed in the course of continued or other fevers.¹ It is well known that it occurs not infrequently as a complication of typhus and typhoid fever. The cases which I have recorded of these diseases would furnish numerous examples. It is to be remarked that in none of the cases in this collection do the histories afford evidence of the existence of degenerative disease of the kidney or Bright's disease. In one case the patient had had acute albuminuria two years before, from which he had recovered; and in another case albuminuria was developed several months afterward. These are the only instances in which there appears any ground for supposing that there may have been a connection between disease of the kidney and the development of the pneumonia. And during the period that these cases were observed, forty or fifty cases, at least, of Bright's disease were recorded. So far as my experience goes, therefore, pneumonia is not to be reckoned among the consecutive affections dependent on disease of the kidney.

In 9 cases the attack was attributed, by the patients, to some unusual exposure, such as working in the cold and wet, and sleeping out of doors at night. But in the majority of cases it could not be traced to any obvious exciting cause. The attack in most of the cases was sudden, the first event being a chill, which was soon followed by pain in the side, febrile

¹ Inadvertently, two cases at New Orleans are included in which the disease was developed in the course of typhoid fever; with this exception the statement holds good that such cases were excluded.

movement, etc. These symptoms usually marked the date of the attack, but sometimes it was not easy to determine precisely when the disease commenced. This collection of cases, also, furnishes a number of examples of pneumonia latent, as regards the symptoms which generally characterize the disease, so that the diagnosis would not have been practicable without the aid of physical signs.

Comparative frequency of Cases of the Disease at New Orleans, Louisville and Buffalo.—As bearing on this point of inquiry, the number of cases of the disease in the three places named, are to be considered relatively to the period in which they were collected, and the number of patients with all diseases under observation. My period of service at the Buffalo Hospital commenced in August, 1848, and continued uninterruptedly for a year and a half. The hospital was then small, the number of medical cases under my care averaging from thirty to forty. Afterwards, for three consecutive years, my service was for six months, commencing in October and ending with March. The hospital had then increased so that my cases averaged from fifty to sixty. My next service was from April to October, in 1855. Next, from April, 1856, to October, 1858. Finally, from April to October, 1858, and from April to June, 1859. The aggregate number of months is 68, or five years and eight months; the average number of patients during the whole of this period being, at least, forty. The number of cases of pneumonia during this period was forty-nine, exclusive of the cases in which the disease was developed in the course of continued fever. It is thus evident, that in the climate of Buffalo, pneumonia is not a disease of very frequent occurrence.

At Louisville, I had charge of the medical wards from October to March, in 1853-4, and in 1855-6, making in all, eight months. During this period, eleven cases of pneumonia came under observation. Without having the data to be precise, the number of medical patients in the hospital during this period averaged about forty. Thus it is evident that pneumonia occurs more frequently at Louisville than at Buffalo, since in less than one-eighth of the period of my connection with the hospital at the latter place, the number of cases collected were less in the proportion only of between one-fourth and one-fifth. Moreover, my service at Louisville did not extend over the months when probably cases of pneumonia are most likely to occur, viz., in March and April.

At New Orleans, my service in 1858-9 was for three months, commencing in the middle of November, and ending in the middle of February. In 1859-60, it was nearly five months, from November 1st, to the latter part of March; in all, a little under eight months. During this period, I collected fifty-three cases. The number of patients under my charge in this hospital averaged about forty. It is thus seen that pneumonia is a disease of much more frequent occurrence in New Orleans than in either Buffalo or Louisville, the number of cases in a little less than eight months exceeding

the number observed in the former of these two places during a period of service extending over five years and eight months; the average number of hospital patients in the three cities during the whole time of service being about the same.

Season.—My hospital cases at Buffalo alone admit of analysis with respect to the occurrence of cases in all the different months of the year, since at Louisville and New Orleans my service was in the winter months only. The forty-nine cases at the Buffalo hospital were distributed among the different months, as follows: January, 7; February, 2; March, 13; April, 9; May, 3; June, 3; July, 3; August, *none*; September, 2; October, 1; November, 1; December, 5.

Fifty-two cases at the New Orleans Charity Hospital occurring between November and March, these two months included, were distributed as follows: January, 11; February, 5; March, 6; November, 17; December, 53. This disparity may be in a measure owing to my service having included only half of November, half of February, and no part of March on one of the two years.

The eleven cases at the Louisville Hospital, occurring in the months between October and March of the years, were thus distributed: January, 8; February, *none*; December, *none*; November, 1; October, 2.

The conclusions to be drawn from the results of an analysis with reference to the points just considered, may be summed up as follows:—

Pneumonia is a disease which has no predilections for any particular periods of life. It affects the male much oftener than the female sex. It is not produced directly by any particular occupation, but occurs chiefly among persons whose callings involve muscular exertion and exposure to the weather. Habits of intemperance render a person more liable to the disease, perhaps in consequence of exposure and other circumstances incident to these habits. It has no pathological connection with periodical fever. Other pulmonary affections do not predispose to it, and some, *e. g.*, asthma, emphysema, and chronic pleurisy, appear to afford a protection against it. It occurs, but not frequently, in persons affected with organic disease of heart. It may be produced traumatically, by external injury, or the passage of a pistol ball through the chest. It is not one of the secondary affections referable to degenerative disease of the kidney. It may not infrequently be traced to some exciting cause, such as unusual exposure to cold or wet, but it oftener occurs when no exciting cause is apparent. It is oftener developed abruptly than in a gradual manner. In respect of frequency, cases are not as numerous at Buffalo as at Louisville, and they are by far more frequent at New Orleans than in the other two places. At Buffalo cases occur in the months of January, March, and April, much more frequently than at other parts of the year; at New Orleans cases were more numerous in November and December than in any other of the

winter months, and of the comparatively few cases observed at Louisville, three-fourths occurred in January.

In view of the much more frequent occurrence of the disease in some parts of the country than in other parts, its greater prevalence at certain periods of the year than at other seasons, and the fact that it attacks especially those who are exposed to the weather, it is reasonable to conclude that the morbid agency, or agencies, determining pneumonia are exterior to the body. Another fact leading to this conclusion, is the much greater prevalence of the disease in some years than in others. This is a matter of common observation. I was led to observe in the New Orleans Charity Hospital, that cases of the disease came in, as it were, in successive crops, that is, cases would be received for several days in succession, and then would follow an interval of several days when few or no cases were admitted. The dates of the admissions of cases into my ward show this on a small scale, but the dates of all the admissions into the hospital, were they at hand, would, I doubt not, exhibit this fact in a striking manner. It would be interesting to see if these irruptions of pneumonia are connected with any uniform meteorological changes, but the data for such a comparison are not at present available. Still another fact leading to the conclusion that pneumonia is determined by external causes, is its occasional prevalence as an epidemic in the southern and southwestern portions of our country, especially among the negro population. This fact is well known, and it is a common belief among practitioners at the south, that epidemic pneumonia in the negro is more apt to be latent as regards its local symptoms, than in the white population, and that it is a much graver affection in consequence of a greater tendency to death by asthenia. It is certain that it destroys many lives, and is the scourge of plantations. Of this form of the disease, I cannot speak from personal observation.

The next points of inquiry will relate to the seat of the disease and the extent of lung affected. With reference to these points I shall interrogate the cases observed at New Orleans, Louisville, and Buffalo, separately, in order to see if the disease in these different places manifests different laws as regards its situation and diffusion.

Analysis with reference to the Seat of the Disease and the extent of Lung affected.

The pneumonia was seated in the *lower lobe of the right lung*, and limited to this lobe in 17 of fifty-seven cases observed at Buffalo, including hospital cases and the cases in private practice. It was thus seated and limited in 11 of fifty-three cases observed at the New Orleans Charity Hospital, and in 1 case of eleven observed at the hospital in Louisville. The proportion relatively to the whole number of cases is thus seen to be somewhat larger in Buffalo than in New Orleans, and considerably larger than in Louisville.

The pneumonia extended over *the whole of the right lung* in 13 of fifty-

seven cases at Buffalo, in 18 of fifty-three cases at New Orleans, and in 6 of eleven cases at Louisville. Here the proportion relatively to the whole number of cases is seen to be precisely the reverse of that in the preceding paragraph, being the largest in Louisville, and larger in New Orleans than in Buffalo. The disparity between New Orleans and Buffalo as regards these two points of inquiry, viz., the proportionate number of cases in which the disease was limited to the lower lobe of the right lung, and the proportionate number of cases in which the disease extended over the whole of this lung, will be found to be not far from compensatory; in other words, the disease extended over the whole of the right lung in a greater number of the cases in New Orleans so as nearly to account for the lesser number of cases in which it was limited to the lower lobe. In the cases in Louisville the number of cases in which the disease extended over the whole of the right lung will more than compensate for deficiency of cases in which it was limited to the lower lobe. From the results thus far given, then, we may draw the following conclusion: In Buffalo, pneumonia, when seated in the right lung, had not so much tendency to extend over the whole of that lung as in Louisville and New Orleans, but was more likely to be limited to the lower lobe. So far as this conclusion goes, a corollary is that pneumonia in Louisville and New Orleans is apt to be a graver affection than in Buffalo, since the gravity of the disease is undoubtedly greater when it extends over an entire lung than when it is limited to a single lobe.

The pneumonia was seated in *the lower lobe of the left lung* in 10 of fifty-seven cases in Buffalo, in 12 of fifty-three cases in New Orleans, and in 3 of eleven cases in Louisville. The proportion to the whole number of cases in the three places is thus seen to be not far from equal.

The pneumonia *extended over the whole left lung* in 5 of fifty-seven cases in Buffalo, in 3 of fifty-three cases in New Orleans, and in 1 of eleven cases in Louisville. Here, too, there is not a notable variation.

The pneumonia was seated in *the upper lobe of the right lung*, and limited to this lobe in only 1 of fifty-seven cases in Buffalo, in 6 of fifty-three cases in New Orleans, and in not one of the cases in Louisville.

It was seated in *the upper lobe of the left lung* in 2 cases in Buffalo, in 1 case in New Orleans, and in not one of the cases in Louisville.

The pneumonia was seated in *the lower lobes of both lungs* in 6 of fifty-seven cases in Buffalo, in 1 of fifty-three cases in New Orleans, and in 1 of eleven cases in Louisville. The preponderance of the number of cases in Buffalo over the number in New Orleans is to be noted.

Four cases only are not included in the foregoing enumeration. These cases are as follows: In Buffalo the lower and middle lobes of the right lung and the upper lobe of the left lung were affected in 1 case; the whole of the right lung and the lower lobe of the left lung were affected in 1 case, and the lower lobe of the left with a portion of the upper lobe was affected

in 1 case. In New Orleans, it is noted in one case that the upper and middle lobes of the right lung were affected in one case.

If the cases at New Orleans and Louisville, in which the right lung was affected, the disease being either limited to one lobe or extending over the whole lung, be added and compared, we have in the fifty-seven cases at Buffalo, 30, and in the fifty-three cases at New Orleans, 36, showing a greater number by six cases at New Orleans than at Buffalo. It so happens that the cases at Buffalo, in which the disease was limited to the lower lobe of the right lung, exceeds the cases in which it extended over the whole of that lung by precisely the same number, viz., 6. There would seem, therefore, to be a somewhat greater tendency of the disease to attack the right lung at New Orleans than at Buffalo; while, as already stated, there is a greater liability to an extension of the disease over the whole of that lung at New Orleans and also at Louisville.

In addition to these inferences from the results of the analysis, there appears to be a greater tendency at New Orleans than at Buffalo in the disease to attack, and to limit itself to the upper lobe of the right lung. On the other hand, the disease seems to attack the lower lobes of both lungs oftener at Buffalo than at New Orleans. As regards the lower lobe of the left lung, and extension over the whole of that lung, the liability to be affected is not far from equal in the three cities, being much less in all than the tendency of the disease to the right lung.

Directing inquiry now to the cases collectively in the three cities, the whole number of cases analyzed is 121. Of these cases the lower lobe of the right lung was alone affected in 29, and the disease extended over the whole of the right lung in 37. The lower lobe of the left lung was alone affected in 25, and the whole of the left lung in 9 cases. The lower lobes of both lungs were affected in 7 cases. The upper lobe of the right lung was alone affected in 8,¹ and the upper lobe of the left lung in 3 cases. The whole of the right lung and the lower lobe of the left lung were affected in 1 case, the lower lobe and part of the upper lobe of the left lung in 1 case, and the lower and middle lobes of the right with the upper lobe of the left lung in 1 case.

These results show the almost invariable extension of the inflammation over at least a lobe of the lungs. They show that the most frequent variety of lobar pneumonia is that in which the inflammation extends over the whole of the right lung. This would not have been expected, and would not be the fact were it not for the cases observed at New Orleans and Louisville, the tendency of the disease to extend over the whole of the right lung being greater in these cities than in Buffalo. The results show that next to the variety, in which the whole of the right lung is involved, that in which the lower lobe of the right lung is alone affected is the most frequent. And at

¹ Including the case in which the upper and middle lobes were affected.

Buffalo the latter variety is the most frequent variety of pneumonia. These results, however, show that the cases in which the disease is limited to the lower lobe of the left lung are nearly as numerous as those in which the lower lobe of the right lung is alone affected. This would not have been expected, the common belief being that the lower lobe of the right lung is much oftener the seat of pneumonia than the lower lobe of the left lung. They show that inflammation seated primarily in the lower lobe of the left lung rarely extends over the whole of that lung. They show that the lower lobes of both lungs (double pneumonia) are rarely affected. They show that pneumonia very rarely attacks primarily the upper lobes, and oftener the upper lobe of the right than the upper lobe of the left lung. They show, finally, that when the whole of either the right or left lung is affected the liability of an extension of the disease to the opposite lung is excessively small.

The next points of inquiry will relate to the complications of pneumonia, and the occurrence of gangrene and abscess. With reference to these I shall interrogate the cases at New Orleans, Louisville, and Buffalo, separately, and compare the results.

Analysis with reference to the Complications of Pneumonia, and the occurrence of Gangrene and Abscess.

Two important complications were oftenest observed, viz: Pericarditis and delirium tremens. The latter affection occurs, of course, only in persons addicted to the abuse of alcohol, and has no special pathological connection with the pneumonia. It is simply a superadded affection, generally attributable in part, or entirely, to the discontinuance or diminished use of alcohol after the attack of pneumonia. We will consider these complications under distinct heads. It is needless to remark that under the name of complications are included those affections only which are developed during the progress of the pneumonia.

Pericarditis.—In the whole number of cases (133) pericarditis was ascertained to exist in 8 cases. It is possible that this complication may have been overlooked in some cases which recovered, and in some of the fatal cases not examined after death. In most, if not all, the cases, physical exploration was directed to the heart; but when patients do not come under observation until the first stage of pericarditis is passed, and still more, if the liquid effusions have been absorbed and the pericardial surfaces agglutinated, the diagnosis is not easy, and may not be practicable.

Of these 8 cases, 5 were among fifty-three cases observed at New Orleans; 2 were among sixty-three cases observed at Buffalo; and 1 case was among the eleven cases observed at Louisville. These results show that this complication occurs oftener at New Orleans and Louisville than at Buffalo.

Six of the 8 cases were fatal. In one of the fatal cases gangrene of the lung took place. In one of the two cases ending in recovery, there occurred

abscess of the lung. These results show the gravity of pneumonia complicated with pericarditis, and also that recovery may take place even when, in addition, the inflammation of the lung eventuates in abscess.

Delirium Tremens.—This complication existed in precisely the same number of cases as pericarditis, viz., in 8 of the 133 cases. It was associated with pericarditis in one of these 8 cases. Three of these 8 cases were fatal, one being the case in which pericarditis also existed as a complication.

Of these 8 cases, 4 were among fifty-three cases at New Orleans; 2 among sixty-three cases at Buffalo; and 1 case was among the eleven cases at Louisville. The proportion of the cases in which this complication existed was larger at New Orleans and Louisville than at Buffalo; but this, of course, only goes to show that a larger number of the patients at the two former places were addicted to intemperance. It does not show any difference as respects the laws or tendencies of pneumonia in the different places.

Other complications were extremely rare. The following are all that were noted in the histories: Parotiditis; yellow fever; phlebitis, with obstruction of the femoral vein; ophthalmia; and intercostal neuralgia; of each a single example only. This shows that, exclusive of pericarditis and delirium tremens, complications of pneumonia are by no means common, and that this is true equally of the disease at New Orleans, Louisville, and Buffalo.

Abscess.—In 4 cases the existence of abscess was ascertained. It may have existed in some fatal cases in which its existence was not known, the bodies not being examined after death. Two of the 4 cases were at New Orleans, one at Louisville, and one at Buffalo. Two of the 4 cases were fatal, and in two recovery took place. The existence of abscess in the cases which recovered was determined by the sudden occurrence of copious purulent expectoration, and by physical signs. In one of the cases which recovered, the pneumonia was complicated with pericarditis.

Gangrene.—The pneumonia eventuated in gangrene of the lungs in one case only. This case was observed at New Orleans, and proved fatal. The pneumonia in this case was complicated with pericarditis.

The number of complicated cases in the whole number of cases analyzed is 21. Of these 21 cases, 13 were among fifty-three cases at New Orleans; 5 were among sixty-three cases at Buffalo; and 3 were among eleven cases at Louisville. This comparison shows a greater frequency of complications at New Orleans and Louisville than at Buffalo, and consequently greater gravity of the disease. In this enumeration of complicated cases, those with abscess and gangrene are not included, and cases are only so considered in which affections become developed during the course of the pneumonia.

Analysis with reference to Fatality and the Duration of the Disease.

Fatality.—Points of inquiry falling under this head relate to the whole number of deaths in all the cases; to a comparison of the ratio of fatality

in the three places in which the cases were observed ; to the fatality in uncomplicated cases as compared with the cases in which important complications or concomitant affections existed ; to the fatality in cases in which the inflammation was limited to a single lobe, as compared with the cases in which two or more lobes were involved, and to the influence of age and habits of intemperance on the fatality.

In the 133 cases there were 35 deaths, making the fatality a fraction over 26 per cent.

The ratio of fatality in the three places was not the same. In 64 cases at Buffalo, there were 11 deaths. In 53 cases at New Orleans, there were 17 deaths. In 11 cases at Louisville, there were 7 deaths. The proportion of fatal cases is thus seen to be considerably larger at New Orleans and Louisville than at Buffalo. At Buffalo the ratio of fatality was a fraction over 17 per cent. ; at New Orleans it was a fraction over 32 per cent., and at Louisville it was a fraction over 63 per cent.

Of the 35 fatal cases, 16 were either complicated or associated with other important affections. Pericarditis was a complication in 6 of these cases ; delirium tremens in 5 cases ; yellow fever in 1 case ; parotiditis, some symptoms of typhoid fever, in 1 case. Meningitis was associated in 1 case ; miliary tubercles in 1 case, and great enlargement of the heart in 1 case.

Deducting from the fatal cases the number in which the pneumonia was complicated or associated with other important affections, the balance is 19. The number of cases in the whole collection in which the pneumonia was complicated, has been seen to be 21 ; deducting this number, the balance is 112. This makes the proportion of the fatality in the uncomplicated cases 19 in 112, or a fraction under 17 per cent.

In only two of the fatal cases not complicated nor associated with other important affections, was the inflammation limited to a single lobe. In one of these cases the inflammation was seated in the upper lobe, and eventuated in abscess. In the other case the inflammation was limited to the lower lobe, and no complication was ascertained during life. The body was not examined after death.

The pneumonia was double in 8 of the fatal cases. The whole of the right lung was affected in 10 cases, and the whole of the left lung in 1 case. In 2 of these cases the inflammation eventuated in abscess. Moreover, in most of the cases complicated or associated with other affections, more than a single lobe was involved. In 1 case pericarditis was associated with delirium tremens and gangrene of the lung.¹

These facts show that pneumonia is more likely to prove fatal at New Orleans and Louisville than at Buffalo, a conclusion which accords with

¹ I have enumerated among the cases of double pneumonia the case of a patient who had recovered from an attack in which the disease was seated in a lower lobe, sufficiently to be discharged, and who soon returned with another attack in which the upper lobe of the opposite lung was affected.

previous facts showing a greater liability to complications, and to an extension of the inflammation over two or more lobes in the two former places.

Another important conclusion is, that pneumonia uncomplicated and not associated with any other important affection, if it be limited to one lobe, is not a disease dangerous to life, since only two examples are contained among the 133 cases now analyzed.

The following questions arise in the present connection: Of the complicated cases, what proportion were fatal? and in how large a proportion of the cases in which the inflammation extended over more than one lobe did death take place? The first of these questions has been in part answered already. It has been seen that of 8 cases complicated with pericarditis, death took place in 6; and of 8 cases in which delirium tremens coexisted, 3 were fatal, pericarditis also existing in one of these fatal cases. Of two cases in which there existed organic disease of the heart, in 1 the recovery took place, and the other ended fatally. In the case which recovered, there existed aortic and mitral lesions with considerable enlargement. In the other case there was considerable enlargement without valvular lesions, and the pneumonia ended fatally in the first stage of the disease. Of the whole number of cases in which some other affections became developed in the course of the pneumonia (21), 11 were fatal. Of 7 cases in which pulmonary tubercles coexisted, recovery took place in all save one, and in the excepted case the lungs were crammed with miliary tubercles.

Directing attention to the second question, of 11 cases in which the pneumonia was double, the number of deaths was 8; of the 37 cases in which the inflammation extended over the whole of the right lung, the number of deaths was 10, and of 9 cases in which the whole of the left lung was involved, the number of deaths was 1 only. Thus, out of 57 patients in whom the pneumonia extended over two or more lobes, 19 died, the proportion being exactly one-third. The fatality is thus seen to be greatest in double pneumonia. Of the 11 cases falling under this head, in 3 the whole of one lung and a lobe of the other lung were affected; but deducting these from the whole number and from the fatal cases, the rate of fatality still takes the lead. Next in the ratio of fatality are the cases in which the whole of the right lung is affected. The fatality is strikingly less when the whole of the left lung is affected, being only as one to nine.

Does age exert any influence on the fatality of this disease? Of 35 fatal cases in which the ages were noted, in none was the age under 10; in 2 cases only were the ages under 20; in 6 cases the ages were between 20 and 30; in 14 cases the ages were between 30 and 40; in 10 cases the ages were between 40 and 50, and in 3 cases the ages were over 50. Comparing these results with those developed by the analysis already made with reference to age, it will be seen that in the largest number of cases in this collection the ages were between 20 and 30, while in the largest number of fatal cases, the ages were between 30 and 40. Of 3

cases under 10, none were fatal. Of 13 cases between 10 and 20, 2 were fatal. Of 44 cases between 20 and 30, 6 were fatal. Of 37 cases between 30 and 40, 14 were fatal. Of 17 cases between 40 and 50, 10 were fatal. Of 7 cases between 50 and 60, 3 were fatal. This comparison shows conclusively that age does exert an influence on the fatality from pneumonia, the liability to a fatal result being greater in proportion as patients approach the age of sixty, this collection of cases containing no examples of a greater age than sixty years.

Does intemperance exert an influence on the fatality? Of the fatal cases the habits were noted in 19. And of these 19 cases, intemperance was acknowledged in 13; 3 of the patients said they were moderate drinkers, and 3 were temperate. This shows a large proportion of intemperate patients; but on reference to the analysis of all the cases with reference to habits, it will be seen that in only 6 of 37 cases was it noticed that the habits were temperate. It is probably true that habits of drinking were noticed in a larger proportion of the cases in which they existed, than the absence of these habits in the cases in which the patients were temperate. Hence, these results do not fairly exhibit the influence of intemperance.

Duration.—The duration of the disease, from the date of the attack to the time when the patient could be pronounced convalescent, appears in the histories of 30 cases. Cases in which the pneumonia was complicated or associated with other important affections, are not included. The shortest duration was 5 days, and the longest duration 23 days. The duration was between 7 and 10 days in 8 cases; between 10 and 15 days in 17 cases; between 15 and 20 days in 8 cases; and between 20 and 25 days in one case. The mean duration in these cases was a fraction over 12 days.

The duration from the date of the attack to the time of death appears in 14 of the fatal cases. The shortest duration was 3 days, and the longest duration 20 days. The duration was between 3 and 5 days in 2 cases; between 5 and 10 days in 7 cases; between 10 and 15 days in 1 case; between 15 and 20 days in 3 cases; and it was 20 days in 1 case. The mean duration, in these cases, was a fraction over 10 days.

The duration in hospital cases, from the date of admission to the time of discharge, varied from 4 to 70 days. Extrinsic circumstances so often affect the discharge of patients, that the length of stay in hospital, in a series of cases, cannot be considered as showing the length of time that the patient was necessarily detained by the disease.

Analysis with respect to Treatment.

With reference to treatment, various points of inquiry arise. The first point which suggests itself, is the proportionate fatality, in cases in which different therapeutical measures were employed. This, however, may not afford evidence of the influence of different measures, in cases of uncomplicated pneumonia, the inflammation being limited to one lobe; for, our

analysis does not furnish more than two examples of death under these circumstances. We can, therefore, expect to bring the fatal result to bear on the investigation of the influence of therapeutical measures, in those cases only in which the disease was associated with some other important affection, or in which the inflammation extended over two or more lobes ; that is, assuming the therapeutical measures not to be in themselves destructive of life.

The duration of the disease, in cases differently treated, is another point of inquiry ; for, next to conducting an affection to a favourable termination, it is an object with the physician to render its continuance as short as possible. The data for determining the duration with precision, however, exist in the histories of only a portion of the cases, as has been already seen ; and I do not expect much from an interrogation with regard to this point.

The immediate apparent effects of remedies constitute an important point of inquiry. Palliation of important or distressing symptoms is an end of therapeutics, ranking next to the abridgment of the duration of a disease. An interrogation with regard to this point may lead to some important conclusions. In studying cases, in this point of view, we are constantly to bear in mind, a liability to error in imputing changes which take place naturally, in the course of a disease, to the influence of remedies.

Above all these objects of therapeutics is the arrest of a disease. These cases are not open to an inquiry on this point ; for in all the pneumonia progressed, and passed through its career. The practicability of arresting pneumonia is a mooted question. My experience furnishes no examples, under any plan of treatment. I am not prepared to say that it is never arrested ; but instances, if they occur, must be extremely rare. In the great majority of the cases which I have collected, the disease had already existed for several days, before coming under my observation ; so that there was little opportunity to employ measures with a view to an arrest. The previous histories, in some cases, will afford information bearing on the question of the efficacy of certain measures employed for that purpose.

To prevent extension of inflammation over more than a single lobe, and to avert certain complications, especially pericarditis and delirium tremens, are important objects in the treatment of pneumonia. We have seen that it is the development of these complications, and the extension over two or more lobes, which render the disease dangerous to life. I should be glad, were the analysis of my cases to develop any information bearing on this point.

As a point of departure for the study of therapeutical agencies in any disease, its intrinsic tendency to death or recovery is to be considered. A very important question preliminary to the consideration of the treatment of pneumonia, therefore, is, How is the disease observed to terminate when left to itself, *i. e.* without treatment ? In answer to this question, I could

cite important facts, which have been contributed by different observers within late years ; but I propose here, as with reference to other points, to limit my attention to the results of the analysis of my own cases. I shall proceed to see if my collection of cases furnishes any examples of pneumonia passing through its career without therapeutical interference. Afterwards I shall direct attention to the different measures which were employed with a view to effect a cure, abridge the duration, and palliate the symptoms of the disease.

Examples of Pneumonia without Treatment.—Three cases only, strictly fall under this head, all of which were observed at Buffalo. I shall add a fourth case, illustrating the progress of the disease under most unfavourable hygienic influences, and with scarcely any medical treatment.

CASE 1. The patient, aged 23, was attacked six days before his admission into hospital. He had no remedies prior to his admission. The lower lobe of the left lung was affected. He was convalescent on the fifth day after admission, and left the hospital on the sixth day. No remedies were given in hospital, exclusive of half an ounce of brandy, three times daily.

CASE 2. The patient, aged 30, was attacked eleven days before his admission. He had no treatment prior to his admission. The lower lobe of the left lung was affected. He was convalescent when admitted, and no remedies were prescribed. The date of his discharge is not noted.

CASE 3. The patient, aged 49, was attacked two weeks before his admission. He had no treatment prior to his admission. The lower lobe of the right lung was affected, and undergoing resolution when he was admitted. No remedies were prescribed, and convalescence progressed rapidly.

CASE 4. This patient was attacked when working alone in a shanty, there being at the time two inches of water on the ground. He was unable to leave his bed, for any purpose, for a week, and during this time he was entirely alone. He had a quart of brandy, which he drank during the week. His habits, as he stated, were temperate. At the end of a week he was visited by some one (not a physician), who gave him thirty grains of calomel. After this he remained alone for ten days. A friend at length came to him, gave him some doses of quinia, and removed him first to his own house, and afterwards to the New Orleans Charity Hospital. The physical signs on his admission into the hospital showed pneumonia affecting the whole of the right lung, and resolution progressing. He remained in hospital six days, convalescence going on rapidly. The only remedy given in hospital was a little syrup of morphia, with milk punch.

In several cases, in which patients entered hospital after the disease had existed for some time, it is stated there had been no treatment prior to admission, and, in some instances, there had been great fatigue and exposure after the commencement of the disease. I shall cite these cases, in order to show that pneumonia may progress favourably without treatment in the early stage, and under circumstances which would, *a priori*, be considered as extremely inauspicious.

CASE 1. The patient had been confined to bed for eight days before admission; had had no medical treatment, and had drank spirits freely during that time. Delirium tremens became developed after his admission, but he was discharged well in ten days. The lower lobe of the left lung was affected.

CASE 2. The patient had been confined to the bed for a week before his admission, and had had no medical treatment. His habits were intemperate. He was discharged well in twenty days. The lower lobe of the lung was affected.

CASE 3. The patient was attacked four days before his admission, and had had no medical treatment. His habits were intemperate. He was discharged well in nineteen days. The entire left lung was affected.

CASE 4. The patient was affected with acute lancinating pain in the side a week before his admission. After the attack he walked nearly a hundred miles to reach a boat for New Orleans. He had had no medical treatment. He was convalescent in ten days. The lower lobe of the left lung was affected.

CASE 5. The patient was attacked a week before his admission, and took at once to the bed. He had had no medical treatment. His habits were intemperate. The whole of the right lung was affected. Pericarditis co-existed on his admission. The inflammation of the upper lobe of the right lung eventuated in abscess. He has discharged well in seventy-two days.

CASE 6. This patient was attacked a week before his admission, and took at once to the bed. The whole of the right lung was affected. The day before his admission, in the month of January, in Louisville, he walked a mile to the hospital, and, not having a permit, he was not admitted. He walked back, and the next day, having obtained a permit, he again walked to the hospital. Death took place on the day after his admission.

CASE 7. This patient, a female aged 16, had been confined to the bed three days before admission, and had no medical treatment. The lower lobe of the right lung was affected. Discharged well in fifteen days.

CASE 8. This patient was attacked five days before his admission. After keeping the bed for three days, he walked seven miles to the hospital in Buffalo, in the month of December. The lower lobe of the right lung was affected. He was discharged well in twenty-eight days.

CASE 9. This patient was attacked three days before his admission, and had had no treatment, except that he took some cathartic pills once. The lower lobe of the left lung was affected. He was discharged well in thirty-one days.

CASE 10. This patient was attacked eleven days before his admission, and had kept the bed most of the time. He had had no medical treatment. The lower lobe of the left lung was affected. The patient convalesced immediately, but the date of his discharge was not noted.

CASE 11. This patient was attacked a week before his admission, and kept the bed. He had had no medical treatment. The lower lobe of the left lung was affected. He was well enough to become an assistant to the ward nurse in twenty days.

CASE 12. This patient was attacked five days before his admission, and kept the bed. He had had no treatment, except that he had of his own accord applied sinapisms to the chest. The lower lobe of the left lung was affected. He was transferred to the surgical ward to be treated for spermatorrhœa in thirty-six days.

Before proceeding to direct attention to the remedial measures employed in these cases, I will give a brief exposition of the general principles which governed the treatment while the cases were under my observation.

Bloodletting, general or local, was employed by me in only one of the cases, which, it will be observed, extend over a period of twelve years. This did not proceed from a determination not to resort to this measure in any case of pneumonia, but because I have, for the period just mentioned, looked upon it as only a palliative, not a curative measure, and have believed that in most instances other measures, less liable to do harm, will accomplish all the good to be effected by bloodletting. Moreover, in the majority of cases, the patients did not come under observation at the commencement of the disease. The previous history, however, in several cases, shows that bloodletting had been employed before the cases came under my care, so that an analysis will develop some facts relating to this remedy.

Tartar emetic was employed to some extent in the early part of the period during which these cases were observed; but, of late years, I have rarely employed this remedy, deeming it unnecessary in most of the cases in which it is not positively contraindicated.

Cathartics and laxatives were prescribed in some cases; but these remedies, for several years past, I have generally omitted, deeming them called for only when there is evidence of undue accumulation of fecal matter.

Blisters, and other severe methods of counter irritation, I have not employed, feeling assured that they may do harm, and not feeling an assurance that they influence favourably the progress of the disease. The pain, which they frequently occasion, is not unimportant; and an additional objection is, they stand in the way of physical examinations, by means of which alone the extent and progress of the local affection can be determined.

Mercurialization in pneumonia I abandoned ten years ago, having been led to the conclusion that the evidence of its efficacy in limiting the amount of exudation and promoting resolution, was not enough to warrant incurring the risk of salivation and other evils.

My treatment of the disease during the greater part of the period, during which these cases were observed, has been *expectant*, using this term, not in the sense in which it is often used, viz., to denote the absence of all active treatment, but in its proper sense as denoting the application of remedies, not to the disease *per se*, but to symptoms and circumstances incidental to the disease in individual cases. I have not employed measures with a view to cut short the disease, nor with direct reference to abridging

its duration. I have not expected, by any particular plan of treatment, to limit the inflammation to a single lobe, nor to prevent the development of pericarditis, believing that, as yet, we have not evidence of the adequateness of any remedies to fulfil these important objects. But the objects of treatment have been the palliation of symptoms, placing the system in a condition of tolerance as regards the disturbance caused by the local affection, and sustaining the vital powers so as to obviate a tendency to death by asthenia or exhaustion, and to promote a speedy and complete recovery. In fulfilling these objects, the indications differ widely in different cases, and the treatment in some cases, so far from being inefficient, may be called heroic with as much propriety as the treatment which consists of excessive bloodletting and other depressing agencies.

As a palliative remedy and as rendering the system tolerant of the disease, opium has seemed to me to be a most valuable remedy in the treatment of pneumonia. For the last five or six years, especially, I have been led to attach great value to the use of this remedy in pretty large doses, and I have, therefore, employed it more freely than previously.

The sulphate of quinia I have prescribed frequently in pretty full doses, but chiefly in cases in which the patients have been subject to intermittent fever, or, as has often occurred, when the latter has shortly preceded the attack of pneumonia, the object being to prevent the concurrence of the two affections.

Alcoholic stimulants and concentrated nourishment, in other words, sustaining measures, have entered frequently and often largely into my treatment of pneumonia during the last five or six years. My experience has led me to think that, judiciously regulated, they are useful in a large proportion of cases, and that heroically employed they not infrequently save life. The stage of the disease, the extent of lung involved, and the existence of complications, have not seemed to me to affect the propriety of sustaining measures, whenever there is danger of death from asthenia, and the extent to which their use is to be carried, as it appears to me, is to be measured by the amount of this danger.

From the foregoing exposition it will be seen that the range of remedies employed in these cases is limited. I shall proceed to interrogate them with regard to bloodletting, antimony, the sulphate of quinia, opium, and alcoholic stimulants.

Bloodletting.—Bloodletting had been employed before the patients came under my observation in 11 cases, and was employed by me in 1 case. Four of these 12 cases proved fatal. Directing attention to the fatal cases, in one case it is stated simply that the patient was bled and the chest blistered on the second or third day after the attack. The day following he was violently delirious; delirium tremens became developed, and death took place the day after his admission.

In another of the fatal cases the patient was admitted into hospital

12 days after the attack. The history simply states that he had been bled and extensively blistered. The treatment after his admission consisted of opium, quinine, and brandy. The whole of the right lung was affected. He became delirious and died on the seventh day after admission.

In the third fatal case the patient was bled on the sixth day, the pneumonia not having been previously ascertained. Twelve ounces of blood were taken away; delirium and death occurred on the following day; the lower lobes of both lungs were affected.

In the fourth fatal case the patient was bled to the amount of twenty ounces, and had wet cups applied on the second day; he stated that he felt relief from the bleeding. On the third day he was again bled to twenty ounces; six hours after the second bleeding there was marked aggravation of pain and other symptoms; four grains of the sulphate of morphia were given between midnight and ten o'clock A. M.; the pain was relieved, the respirations were less frequent, and the frequency of the pulse was diminished. He remained comfortable during the next day; during the night delirium tremens became developed, and death took place; the whole of the right lung was affected.

It would be unfair to impute the fatal result to the bleedings in these cases, since the whole of the right lung was affected in two cases, the lower lobes of both lungs in one case, and in the remaining case delirium tremens coexisted. That the remedy was probably injurious must be admitted, death taking place by asthenia in all the cases.

In the 8 cases in which recovery took place, bloodletting was employed as follows: On the first day in 2 cases; on the second day in 3 cases; on the fourth day in 1 case; on the sixth day in 1 case; and in 1 case the history only states that the patient had been twice bled before his admission on the fifth day. In none of the cases, except the last, had bloodletting been employed more than once; in one case wet cups had been employed; in three of the cases a blister had been applied, and one of the patients was salivated on his admission.

In four of these cases the inflammation was limited to one lower lobe; in three cases the upper and lower lobes were affected; and in one the extent of the inflammation does not appear in the history. In one case the pneumonia became complicated with pericarditis after the bleeding.

The immediate apparent effects of the remedy are noted in only two cases. In one of them, employed on the sixth day, it appeared to afford distinct relief, the pulse and respirations being diminished in frequency, and in the other case the patient experienced so much relief as to work at his calling (plasterer) a portion of the following day.

The longest duration of the disease in these cases, from the date of the attack to convalescence, was 30 days, and the next longest 15 days. The shortest duration was 9 days, and the next shortest 11 days; the mean duration was a fraction under 15 days. The mean duration of the stay

in hospital was a fraction under 25 days. In making a comparison, as regards duration, with the results of an analysis of the cases of uncomplicated pneumonia already given, it is proper to exclude the case in which the pneumonia was complicated with pericarditis. The duration in this case was 30 days. Excluding that case, the average duration, from the attack to convalescence, is exactly the same as in the aggregate of the cases in which the duration appears in the histories, viz., a fraction over 12 days.

So far as any conclusions are admissible from these facts, they go to show that the bleeding did not prevent the extension of the disease to the entire lung, which occurred in 5 of the 12 cases; nor the affection of the lower lobes of both lungs, which occurred in 1 case; nor the development of delirium tremens, which occurred in 1 case; nor the occurrence of pericarditis in 1 case. It did not diminish the fatality, which was at the rate of 36 per cent., being considerably larger than the rate in all the cases (26 per cent.); much larger than the rate at Buffalo (17 per cent.); somewhat larger than at New Orleans (32 per cent.);¹ but falling below the rate at Louisville (63 per cent.). It did not, however, affect unfavourably the duration of the disease in the cases which recovered, nor the length of stay in hospital. And it appeared to afford relief in the two cases in which the immediate apparent effects were noted.

Tartar Emetic.—This remedy was prescribed in one only of the cases observed at New Orleans, and in one case only at Louisville. It was prescribed in 10 of the cases observed at Buffalo. In all of these 12 cases it was given in small doses (gr. $\frac{1}{16}$ or $\frac{1}{8}$), and in nearly all cases given in conjunction with opium or the sulphate of morphia in small doses. It was always suspended if it occasioned vomiting or much nausea. It was given in those cases only in which there was high febrile movement with heat of skin, and never when supporting measures were indicated. As thus employed, this remedy could not be expected to affect very materially the progress of the disease. Palliation of certain symptoms was alone looked for through its sedative influence on the circulation and nervous system. It will suffice, therefore, to examine the cases with reference to its immediate apparent effects.

CASE 1. Given during one day, the third day after admission into the hospital, it occasioned vomiting, and was then discontinued. The symptoms were not relieved, but marked relief followed the administration of the sulphate of morphia, which was given after the antimony was discontinued.

CASE 2. The patient was 5 years of age. The remedy was given in doses of gr. $\frac{1}{8}$ hourly, for several nights in succession. Frequently it produced vomiting, and it was then suspended. This constituted chiefly

¹ None of the cases in which bloodletting had been employed were observed at New Orleans.

the treatment in this case. Convalescence was distinct on the seventh day, and the patient discharged on the twelfth day.

CASE 3. Given in doses of gr. $\frac{1}{4}$, with the same quantity of the sulphate of morphia, every four hours. On the seventh day of the disease, there was a marked improvement in the symptoms. On the following day, neither vomiting nor nausea having been produced, the antimony was discontinued. The case progressed favourably.

CASE 4. The remedy was prescribed on the day of admission into hospital, third day of the disease, in doses of gr. $\frac{1}{16}$, hourly. The first dose vomited, and the remedy was suspended. The day following there was marked improvement, the pulse falling from 130 to 110, and the respirations from 36 to 30. It is hardly probable that this improvement was due to the single dose of the remedy; and as no other remedy was given, it must be attributed to a favourable change occurring naturally in the progress of the disease.

CASE 5. The remedy was given on the day of admission into the hospital, the fifth day of the disease, in doses of gr. $\frac{1}{16}$, hourly, and at night the sulphate of morphia, gr. $\frac{1}{8}$, was prescribed. This treatment was continued for five days. There was no improvement till the fifth day, and on this day it was marked, the pulse falling from 124 to 88, and the respirations from 36 to 28. Convalescence speedily followed.

CASE 6. The remedy was given on the fourth day of the disease, in doses of gr. $\frac{1}{16}$, with the sulphate of morphia gr. $\frac{1}{8}$, every four hours. This treatment was continued for two days. The symptoms denoted improvement, the pulse falling from 120 to 96, the respirations, however, remaining the same, viz., 24. The antimony was then discontinued, and the morphia given alone. The case progressed favourably.

CASE 7. The remedy was given on the day of admission into the hospital, the third day of the disease, in doses of gr. $\frac{1}{8}$, every two hours, and at night the sulphate of morphia gr. $\frac{1}{8}$. It occasioned nausea and vomiting, and was suspended at the end of twenty-four hours. There was a marked improvement on the following day, the pulse falling from 100 to 92, and the respirations from 32 to 20. The case progressed favourably.

CASE 8. The remedy was given on the second day after admission into the hospital, the 5th day of the disease, in doses of gr. $\frac{1}{8}$ hourly, with the sulphate of morphia gr. $\frac{1}{8}$ every four hours. This treatment was continued for several days, and in the mean time bloodletting was employed once. This case progressed favourably.

CASE 9. The remedy was given on the day of admission into the hospital, the third day of the disease, in small doses (the quantity not noted), in conjunction with small doses of the sulphate of morphia. The improvement on the second day was marked, the pulse falling from 108 to 78, and the respirations from 22 to 16. The treatment was continued, and no other remedy given except a saline laxative. The patient was convalescent on the eighth day from the date of the attack.

CASE 10. The remedy was given on the third day after admission into the hospital, the seventh day of the disease, in doses of gr. $\frac{1}{8}$ hourly and Dover's powder, gr. vi, every four hours. The next day the improvement

was marked, the pulse falling from 120 to 96, and the respirations from 56 to 32. The treatment was continued, and the case progressed favourably.

CASE 11. The remedy was given on the day of admission into the hospital, the fourth day of the disease, in doses of gr. $\frac{1}{8}$, with the tincture of opium, gtt. viii, every two hours. Death took place on the following day. The patient had great enlargement of the heart. This was the only fatal case in which tartar emetic entered into the treatment.

CASE 12. The remedy was given on the sixth day after admission into the hospital, the tenth day of the disease, in doses of gr. $\frac{1}{4}$, with opium, gr. $\frac{1}{2}$, every four hours. The patient was delirious, making efforts to get out of bed. The treatment was continued for two days. The delirium ceased, and the pulse fell from 92 to 68, the respirations not diminished. Three days afterward convalescence was declared.

An examination of these cases leads to the conclusion that small doses of antimony are often useful in this disease, as shown by diminution of the frequency of the pulse with or without the respiration becoming less frequent, and by relief of delirium. In view of the facts which the cases present, I cannot but think that, of late years, I have undervalued the utility of this remedy. It is true that to the sulphate of morphia or opium, generally given in conjunction with the antimony, may be due more or less of the improvement which was apparent in most of the cases. But the doses of the latter remedy were small, and it is fair to presume that, making also due allowance for the natural progress of the disease, the antimony exerted in several of the cases a certain amount of palliative influence. In connection with the facts presented in these cases, it is to be borne in mind that antimony was not given under circumstances which would be likely to render a depressing remedy injurious, either directly or indirectly, by conflicting with supporting measures. It is also to be borne in mind that these results relate only to the remedy as given in small doses, and discontinued when vomiting or much nausea were produced, not to large doses continued in spite of vomiting, until tolerance is established, after the method of Rasori, which was so highly extolled by Laennec.

My collection of cases furnishes but a single instance in which the *veratrum viride* was employed. That my experience with this remedy is so limited in this disease is not because I have not appreciated the testimony of many observers, within the past few years, to its utility, but simply because my attention has been pre-occupied with other points of observation.

In the single case in which this remedy was employed, it was given on the second day after admission into the hospital, the fourth day of the disease, in doses of gtt. v every two hours. The pulse fell on the following day from 116 to 112, and the respirations from 28 to 24. The treatment was continued, and on the next day the pulse fell to 96, but the respirations rose to 32. The remedy produced vomiting and considerable prostration and was discontinued. During the two days that the remedy was given the inflammation extended from the lower to the upper lobe. When

the veratrum viride was discontinued, full doses of the sulphate of morphia were given, the patient becoming partially narcotized. On the day after this change was made the pulse fell to 80, and the respirations to 12. The next day the pulse was 64, and the respirations 16. The case progressed favourably.

The Sulphate of Quinia.—This remedy entered more or less into the treatment in 32 cases. In 9 of these cases it was given in doses of gr. ii three times daily, generally in conjunction with opium in small doses, brandy in some cases being also given, and sometimes the carbonate of ammonia. It is impossible, from an examination of these cases, to form any estimate of the influence of the remedy. In nearly all of the remaining 23 cases the remedy was given in doses of gr. v three times daily, and continued for a variable period. In most of these cases opium in small doses was given conjunctively, and in several of the cases, also, alcoholic stimulants. Without introducing an account of the cases severally (which from their number would occupy considerable space), I will content myself with giving certain facts and conclusions based upon abstracts of the histories now before me.

Of the 23 cases, 3 only were fatal. This small fatality might be considered as evidence of the value of the remedy; but all the cases which recovered, save 3, were uncomplicated, and the inflammation was limited to a single lobe in all the other cases save one. Of the complicated cases, pericarditis existed in 1, phlebitis affecting the femoral vein in 1, and dysentery in 1 case; and in the case in which the inflammation extended beyond a single lobe, the whole of the right lung and the lower lobe of the left lung were affected. On the other hand, of the 4 fatal cases, in 2 the whole of the right lung was affected; in 1 case the whole of the right lung was affected, and pericarditis was a complication; and in 1 case yellow fever existed. In view of these facts it is doubtful whether any inference as to the value of the remedy is to be drawn from the fatality, except that it did not exert an unfavourable influence on the termination of the disease.

An examination of the symptoms before the remedy was given, and during its administration, furnishes no evidence that the immediate apparent effects were unfavourable in any instance. On the contrary, the immediate apparent effects were in several instances favourable in a marked degree. The histories show that the pulse in several cases diminished in frequency notably under the use of the remedy, a corresponding reduction in the frequency of the respirations sometimes taking place and sometimes not. In 1 case the reduction of the pulse in 24 hours was from 132 to 112, the respirations not being lessened. In 1 case the pulse fell, in 24 hours, from 100 to 72, and the respirations from 24 to 20. In 1 case, in 48 hours, the pulse fell from 108 to 88, and the respirations from 34 to 24. In 1 case, on the second day, the pulse fell from 124 to 104, and the respirations from 32 to 24. In 1 case, on the fourth day, the pulse fell to 56, the respirations

being 24. In 1 case, on the second day, the pulse fell from 145 to 120, and the respirations from 36 to 32. In 1 case, on the second day, the pulse fell from 88 to 76, and the respirations from 20 to 18; and on the day following the pulse was 56, and the respirations 16. In 1 case, on the second day, the pulse fell to 52, and the next day to 48, the respirations on the latter day being 12.

Making due allowance for changes like these which may occur naturally in the course of the disease, it may be assumed that this remedy, in doses of gr. v three times daily, produces often a marked sedative influence upon the circulation without any unpleasant consequences, and, therefore, it is to be considered as a useful remedy in the treatment of the disease.

Examining the cases which recovered in the treatment of which the quinia constituted the sole or the chief remedy, I find that in most of them the improvement was progressive, and the duration of the disease short.

In one of the fatal cases pericarditis was developed while the patient was taking the remedy; and in another case in which this was the most prominent remedy, the patient returned the day after being discharged, with a second attack of pneumonia affecting another lobe, which eventuated in abscess and death.

In prescribing the larger doses of this remedy, I have generally had in view chiefly the prevention of intermittent fever, as a complication of the pneumonia. I have been in the habit of prescribing the remedy to patients who were subject to intermittent fever, or, as has frequently occurred, who had experienced an attack of that affection shortly before the attack of pneumonia. This may perhaps, in a measure, serve to explain a fact which has already appeared, viz., the non-concurrence of pneumonia, and intermittent fever in my experience. The fact, however, is by no means thus fully explained, for it is to be borne in mind that in a large majority of the hospital cases, the disease had existed for several days before the patients came under my observation; if, therefore, intermittent fever predisposed strongly to pneumonia, or pneumonia tended to excite an attack of intermittent fever, the combination of the two affections should have been presented in some instances before an opportunity was offered of prescribing the quinia.

The reader need not be reminded of the difficulty, or rather the impossibility of arriving at the exact value of any remedial agency, since we can never assume that two or more cases of the same disease are precisely similar, and since we can never know what should have been the progress of the disease, and the termination in any case had other or no remedies been employed. If the analytical investigation of recorded cases be the best, or the only method of developing the fruits of therapeutical experience, we can only hope, by means of this method, to reach approximations to exactness in our deductions.

Opium.—Under the head of opium I include, of course, the sulphate of

morphia, which was the form of opiate chosen in a large proportion of cases, and Dover's powder, which was sometimes given. Opiates entered more or less into the treatment in 100 cases. In some cases it was given in conjunction with tartar emetic, and continued after the latter remedy was discontinued. The doses of the opiate were small in these cases, but it is fair to impute to this remedy a share of the apparent effects of the treatment. In other cases the opiate was given either with, or subsequent to the administration of quinia in full doses. It is difficult to say how much of the immediate apparent effects of the treatment in these cases is to be attributed to the opium. In a few cases the opiate was combined with calomel. Excluding the cases in which antimony, quinia, and calomel, entered prominently into the treatment, opium was either the only, or the most important remedy given in 49 cases. In many of these 49 cases, however, as will be seen presently, alcoholic stimulants entered more or less largely into the treatment.

Of these 49 cases, in nearly all the remedy was given in pretty full or large doses, that is, the sulphate of morphia was given in doses of gr. $\frac{1}{4}$, or upwards, every 4 or 6 hours, or opium in doses of gr. ii, or upwards, every 4 or 6 hours. This was true of 46 of the 49 cases. In the remaining 3 cases, the remedy was given in smaller doses merely to palliate cough, or to promote sleep. Eliminating these 3 cases, and we have 46 in which the quantity of opium given was sufficient, as we may suppose, to affect favourably or unfavourably, to a greater or less extent, the progress of the disease. We will proceed to interrogate these cases, in order to see what conclusions may be drawn as respects the utility of the remedy.

These cases are among those observed since the summer of 1855. During this summer my attention was first directed to the apparent utility of opium in full doses in pneumonia. One of the first cases in which I employed this treatment was the case in which the veratrum viride had been employed for two days, during which time the pulse was reduced, but the respirations increased in frequency, and the remedy was discontinued in consequence of vomiting and prostration. The sulphate of morphia, gr. $\frac{1}{2}$, repeated every 4 or 6 hours, was then prescribed. The whole of the left lung was affected in this case. On the next day the following record was made: "This patient reports much better. He says he is entirely free from pain, and complains only of weakness. He is very distinctly under the influence of the morphia. When not aroused, he drops at once asleep. The respirations are but 12 per minute (the day previous they were 32). He is, however, roused without difficulty. The pulse is 80 (on the day previous 96). The skin is moist. The cheeks are less congested than on yesterday. Cough has not been troublesome, and the expectoration is slight. The difference, as regards pain, cough, expectoration, etc., between to-day and yesterday is striking. Is it due to the morphia?"

The morphia was continued in doses of gr. $\frac{1}{4}$ every 4 hours, and on

the following day the pulse was 64, and the respiration 16. The following note was appended to the record on that day: "The cessation of all the rational symptoms of an important pulmonary disease, whilst the two lobes of the left lung are still solidified, as shown by the physical signs, is a highly interesting fact. It is also an interesting fact that this cessation occurred rapidly under the treatment with full doses of the sulphate of morphia."

Two days afterward a saline laxative was given, no dejection having occurred for a week, and the next day no medicine was prescribed. On the following day he sat up, and convalescence progressed rapidly.

At the same time another case was under observation, in which the whole of the left lung was affected. On the 3d day after admission into the hospital, and 10th of the disease, the pulse was 92, and the respiration 40. The patient was delirious and had had diarrhœa, which had been arrested by enemata of laudanum. Dover's powder, gr. v, 3 times was prescribed on this day, with brandy and nutritious diet. On the following day the delirium had disappeared, the pulse had fallen to 76, and the respirations to 28. This treatment was continued for two days, and the sulphate of morphia, gr. $\frac{1}{2}$ every 4 hours, was prescribed. On the following day the pulse was 60, the respirations 24, and the patient asked to sit up. Under this date the following note was appended to the record: "The same interesting facts noted this day in an analogous case of pneumonia with solidification of an entire lung, are illustrated in the case of McClellan, viz: 1st. Pulse below the average of health, no embarrassment of breathing, etc., while the two lobes are solidified; 2d. This state of things under the influence of morphia."

These cases led me to adopt this treatment frequently afterward in cases of pneumonia, and it has occurred to me in other instances to meet with the same marked improvement under the treatment.

Of the 46 cases treated with full doses of opium, 11 were fatal, a fraction over 23 per cent. This is somewhat under the fatality in the whole number of cases analyzed, which was a fraction over 26 per cent.

These 46 cases were distributed between New Orleans, Louisville, and Buffalo, as follows: At New Orleans, 28 cases; at Louisville, 4 cases, and at Buffalo, 14 cases. Now, inasmuch as we have seen that the rate of mortality from pneumonia differs in these three places, it will be proper to compare the places as regards the proportion of fatal cases in those under present consideration. Of the 11 fatal cases, 8 were at New Orleans, 2 were at Louisville, and 1 was at Buffalo. The percentage of fatality in the three places therefore, is as follows: New Orleans 28 per cent.; Buffalo 14 per cent., and Louisville 56 per cent. (disregarding fractions). At New Orleans and Buffalo the rate in these cases falls below the rate in all the cases of pneumonia observed at these places, whilst at Louisville the rate is higher. It is interesting to see that the difference in the

rate of fatality in these cases at New Orleans and Buffalo (where all the cases were observed except 4), is about the same as the difference in the rate in all the cases of pneumonia observed at these two places, the latter being as 32 to 17.

Of the 8 fatal cases at New Orleans, the pneumonia was complicated with pericarditis in 2, and with delirium tremens in 3, leaving only 3 uncomplicated cases which were fatal. Excluding the complicated cases, the rate of mortality would be only 10 per cent. Of the 2 fatal cases at Louisville, in 1 the pneumonia was associated with miliary tubercles. Excluding this case, the rate of mortality would be 25 per cent. In the single case at Buffalo, no complication was discovered, but the pneumonia was double.

In view of the foregoing facts, so far as any conclusion from the fatality is admissible, it is certainly favourable to the treatment of the disease with full doses of opium, as compared with the other methods of treatment pursued in the cases which I have collected. As bearing on this conclusion, the proportion of cases among those which recovered in which the inflammation extended over a whole lung, or to the lower lobes of both lungs, and the number of cases in which the pneumonia was complicated, are to be considered. Among the cases treated with full doses of opium, ending in recovery, there were 12 in which the inflammation extended over a whole lung, or 30 per cent. while the proportion in 110 cases treated by different methods and including fatal cases as well as those which recovered, was only a fraction over 31 per cent. In 1 of the cases treated with full doses of opium, and ending in recovery, the pneumonia was double; in 4 cases the pneumonia was associated with delirium tremens, and in 1 case with pericarditis. These facts certainly strengthen the conclusion as to the utility of this treatment, but they go to show that full doses of opium do not afford a protection against the extension of the disease beyond a single lobe.

The duration of the disease is determinable from the histories in 22 of the 35 cases which ended in recovery. The shortest duration from the date of the attack to convalescence was 5 days. The next shortest duration was 7, the next 8, and the next 9 days. The longest duration was 77 days, but in this case the pneumonia was complicated with pericarditis, and eventuated in abscess of the lung. The next longest was 20, the next 16, and the next 15 days. Excluding the case in which pericarditis and abscess of the lung occurred, the mean duration in the 22 cases was a fraction over 11 days. This is slightly under the mean fatality in the uncomplicated cases (ending in recovery) analyzed without reference to treatment.

In addition to the two cases already cited, in which marked improvement took place rapidly under the treatment with full doses of opium, these cases furnish 3 examples. In one of these, on the 4th day after admission into hospital, the sulphate of morphia, gr. $\frac{1}{4}$ every 4 hours, having been pre-

scribed, the pulse fell in 24 hours from 120 to 108, and the respirations from 26 to 18. In another case, the same remedy in the same doses having been prescribed, the pulse fell in 24 hours from 104 to 84, and the respirations from 28 to 20. This was a fatal case, the pneumonia being complicated with miliary tubercles. In the remaining case, on the second day after admission, under the same doses of the remedy, the pulse fell in 24 hours from 102 to 80, and the respirations from 36 to 24. The abstracts of some of the histories which I have made for the present analytical investigation do not contain the data for determining the immediate apparent effects of this remedy.

I have stated already that in a number of instances alcoholic stimulants were given more or less largely in connection with opium. This was true of 16 of the 46 cases, 3 of these cases being fatal. In 12 cases opium was the only remedy employed, and of these cases 3 were fatal. Carbonate of ammonia was conjoined in the treatment in 2 cases, and the muriate of ammonia in 1 case. Small doses of quinia were given in conjunction in 2 cases. Quinia on one day, and brandy during the disease, were added in 2 cases. Brandy and carbonate of ammonia were both conjoined in 5 cases, one of which was fatal. Brandy and the muriate of ammonia were conjoined in 3 cases. Wine was alone added in 1 case, which was a fatal case. Hyoseyamus was added in 1 case. A little quinia and antimony preceded the opiate treatment in 1 case. Finally, quinia and muriate of ammonia with brandy entered into the treatment in one case, but in this case the sulphate of morphia was given in doses of gr. $\frac{1}{2}$ every 6 hours. These facts are given to show that in the cases in which other remedies were added (excepting alcoholic stimulants), they were subordinate to the opium treatment.

In the statement already made as to the amount of opiates given, I have mentioned the minimum quantities of opium or of the sulphate of morphia in the cases which are considered as having been treated with full doses of this remedy. In 20 cases the amount exceeded the minimum quantities mentioned. Of these 20 cases, in 2, half a grain of the sulphate of morphia was given three times daily, one of the cases being fatal; in 5, half a grain was given twice daily, one of these cases being fatal, delirium tremens existing as a complication; in 9, half a grain was given every 6 hours, one being fatal, delirium tremens existing; in 3, half a grain was given every 4 hours, one being fatal, delirium tremens existing; and in 1 case six grains were given between 9 A. M. and 11 P. M., delirium tremens existing, and the patient recovered. I have already, in another connection, cited a case not embraced in these cases because bleeding was a prominent measure of treatment, in which four grains of the sulphate of morphia was given between midnight and 10 A. M., with marked temporary improvement, delirium tremens becoming subsequently developed and the case ending fatally. I have never observed more than slight narcotism produced by the foregoing

quantities of the remedy, a fact which shows that pneumonia involves tolerance of full doses of opium.

Alcoholic Stimulants.—Prior to 1852 I had not prescribed alcoholic stimulants in pneumonia except toward the close of life in fatal cases, and in small quantities sometimes during convalescence. The first of the cases in this collection in which I was led to employ alcoholic stimulants during the progress of the disease, came under observation in the year just named. I saw the patient in consultation on the eighth day of the disease with my friend, Dr. C. H. Wilcox. The whole of the right lung was affected. He had had delirium from the commencement, manifested by incoherency and efforts to get out of bed. He had been treated with antimony, calomel, vesication, and small doses of opium. The pulse was 120, and the respirations 20. Brandy was given tentatively with Dover's powder. Finding that the symptoms denoted improvement, the brandy was given freely. On the third day, after commencing the use of stimulants, the pulse had fallen to 80, and the mind was clear. Shortly afterward convalescence was pronounced, and he recovered rapidly.

From that time I have used alcoholic stimulants very frequently, and often freely in cases of pneumonia. I have long since ceased to think that there is much, if any, risk of doing harm by a premature use of stimulants, although I have not considered that all cases call for their use. On examining the cases that have since occurred I find that alcoholic stimulants in some form, and to a greater or less extent, entered into the treatment of 73. Of these 73 cases, 18 were fatal. This fatality is at the rate of 24 per cent., but it is to be considered that in cases tending to a fatal result stimulants are almost always given more or less freely, so that the proportion of deaths cannot be taken as any evidence of the treatment in this respect being unfavourable, certainly without examining carefully the circumstances of the cases individually. Moreover, in nearly all of the cases, fatal or otherwise, other measures of treatment were conjoined with the use of stimulants.

Among the cases in which stimulants were used I find but two in which they constituted the sole treatment. In one of these cases the patient, on admission into hospital, was delirious; the pulse was 130; the respirations 24; the whole of the right lung was affected, and the prolabia were livid. Brandy on the first day was given every half hour, the quantity not noted. On the following day the improvement was marked; the pulse had fallen to 112, the respirations remained the same; but the lividity was lessened, and the delirium had disappeared. The patient recovered, no remedy but brandy being given. In the other case the disease was less severe. A single lobe only was affected. Brandy half an ounce three times daily constituted the treatment. Convalescence was pronounced the twelfth day after the date of the attack.

In the cases ending in recovery in which alcoholic stimulants were used

in conjunction with other measures, it is impossible to determine demonstratively to what extent they affected the progress of the disease. I can only assume that in these cases no unfavourable effect was produced. It is by no means probable that they were inoperative either for good or harm and, if not hurtful, it is fair to presume that they were beneficial. I believe the judicious use of stimulants to be of not a little utility in the treatment of pneumonia, and that by their free use in certain cases lives are saved which would otherwise be lost. This, however, is an opinion, the correctness of which cannot be proved by the facts contained in these cases, nor can a similar opinion with regard to any therapeutical measure be demonstratively established. I shall content myself with giving some account of the quantity of stimulants given in the 55 cases ending in recovery.

Of these 55 cases, in 11 brandy or whiskey was given in the form of milk punch. The quantities given in this form were often as great as when the brandy and whiskey were given in water, but they are not definitely stated in the histories. In 8 cases it is simply stated that brandy or whiskey was given more or less freely. In 3 cases wine or porter was given. Of the remaining 33 cases in which either brandy or whiskey, given in water, was continued for a greater or less period during the progress of the disease, the quantities were as follows: Two ounces every 2 hours in 5 cases; every 3 hours in 2 cases; every 4 hours in 5 cases; three times daily in 3 cases. One ounce every hour in 1 case; every 2 hours in 1 case; every 3 hours in 1 case; every 4 hours in 4 cases; three times daily in 2 cases. Half an ounce every hour in 1 case; every 2 hours in 1 case; every 3 hours in 1 case; every 4 hours in 4 cases; three times daily in 2 cases.

The coexistence of pericarditis did not prevent the use of stimulants. They were given freely in two cases in which this complication existed, and recovery took place. They were also used freely, and, with moderate doses of the sulphate of morphia, constituted the treatment in the case of a patient affected with organic disease of heart, involving mitral and aortic lesions and considerable enlargement. In this case the pneumonia extended over the whole of the left lung. The pulse rose to 140, and the respirations to 48 in this case. Convalescence was pronounced in 6 days.

The use of alcoholic stimulants being conjoined with other measures, generally with quinia or opium, save in the two cases already cited, we cannot study their immediate apparent effects in these cases, nor their influence on the duration of the disease. An examination of the cases, however, leads to this important result, viz., in no instance does a comparison of the symptoms, before and after commencing their use, afford evidence of an aggravation of the disease having been produced by them.

The muriate of ammonia was the only remedy given, except a little wine, in one case. The patient was admitted into hospital on the sixth day of the disease; the pulse was 100, and the respirations 40. A drachm of the muriate of ammonia three times daily was prescribed; on the next day the

pulse was 84, and the respirations 36; the next day the pulse was 72, and the respirations 24; convalescence was declared on the following day. This remedy was given in several cases, but in conjunction with other remedies, so that its apparent effects cannot be studied. This remark will apply also to the carbonate of ammonia.

With regard to diet, in the cases in which alcoholic stimulants were given, concentrated nourishment was generally directed, viz., essence of beef, or chicken soup, and milk. These articles of food, given at short intervals, were considered as important adjuncts to the stimulants, together forming the sustaining treatment. As a rule, of late years, in cases of pneumonia, I have allowed solid animal and farinaceous food as soon as convalescence is declared, and a speedy return to full diet. I have also encouraged patients to sit up early, and to take moderate exercise as soon as their strength will permit.

In leaving the subject of treatment, I would remark that it does not fall within the scope of this paper to discuss the rational indications for different remedial measures in pneumonia, or to consider the circumstances under which different remedies are contraindicated. My present object has been to develop, by analysis, the facts pertaining to the treatment of the cases which I have observed, and to present the conclusions to be drawn from the facts. The latter may be summed up as follows:—

A few cases in this collection illustrate the favourable progress of the disease and recovery without medical treatment, and even under most unfavourable hygienic circumstances. Recovery, the favourable progress of the disease and a brief duration, even if an entire lung be affected, do not necessarily constitute evidence of the curative efficacy of any plan of treatment which may have been pursued. But on the other hand, taking into view the fact that in only two cases in this collection in which the disease was uncomplicated and limited to a single lobe, did it prove fatal, a considerable number of fatal cases when no important complication existed, and the disease did not extend to two or more lobes, should be considered as furnishing good grounds to suspect that the treatment pursued contributed to the fatality.

This collection of cases furnishes a number of examples (12) of persons who received no medical treatment for several days after having been attacked with the disease, in several instances having been exposed to fatigue and other unfavourable circumstances, and in all, save one, the disease progressed favourably and ended in recovery.

The analysis of 12 cases in which bloodletting was employed, furnishes no evidence that this measure affected favourably the progress of the disease, nor, on the other hand, any positive evidence that it affected the progress of the disease unfavourably. In some of the cases it appeared to afford relief.

Tartar emetic given in small doses when there existed high febrile move-

ment with heat of skin, appeared in several instances to be useful as a palliative remedy, reducing the frequency of the pulse and respirations.

The sulphate of quinia given in full doses, *i. e.* gr. v 3 times daily, was not found to exert apparently an unfavourable influence in any instance. It produced in several instances a marked sedative effect upon the circulation, and, as a palliative, appeared to be a useful remedy. It is probable that it may, in some cases, have prevented the concurrence of intermittent fever with the pneumonia, although facts previously developed go to show that this coincidence is not apt to take place when the remedy is not given.

Opium in full doses appeared in some cases to produce a marked improvement in the symptoms of the disease. It appears also to have affected favourably the progress of the disease, diminishing its fatality, and abridging slightly its duration. There is no evidence, however, that it prevents the extension of the inflammation beyond a single lobe of the lungs. Patients with pneumonia sometimes manifest a tolerance of this remedy in large doses, that is, narcotism may not be produced even when several grains of the sulphate of morphia are given within a few hours.

Alcoholic stimulants given more or less freely, and continued for a greater or less period during the progress of pneumonia, produced no apparent unfavorable effects. The facts developed by this analysis are consistent with the opinion that, given in conjunction with opium and nutritious diet, they affect favourably the progress of the disease, and diminish its fatality. They are not contraindicated by the coexistence of pericarditis or organic disease of the heart.

The scope of this paper has not embraced the study of the symptomatic phenomena of pneumonia. With reference, however, to one symptom, I propose, in conclusion, to interrogate the few cases in which it was made a subject of observation. I refer to the presence or absence of the chlorides in the urine. It has been recently stated that the chlorides disappear from the urine during the progress of the exudation in pneumonia, and reappear so soon as the exudation ceases. Hence, it is considered by some that the absence of chlorides is evidence that the inflammation is extending, while, on the other hand, their reappearance is a test that the inflammation has reached the limit of its extension. My attention was directed to this subject in recording some of the cases which came under observation last winter (1859-60). I shall proceed to interrogate these cases.

Analysis with reference to the Presence or Absence of the Chlorides in the Urine.

The urine was examined with reference to the presence of the chlorides in 11 cases. I shall give the facts, so far as they relate to the present object of inquiry, in the cases respectively.

CASE 1. The patient was admitted into the hospital on the 3d day of the disease. The lower lobe of the left lung was affected. On the 3d day

after admission, the symptoms were worse; the pulse was 128, and the respirations had increased from 32 to 40 per minute. The physical signs of solidification over the affected lobe were more marked. The urine examined on this day presented not a trace of the chlorides. On the 5th day after admission the patient's condition was much improved. The pulse and respirations were less frequent; the signs of solidification of the affected lobe continued. The urine examined on this day was found to contain the chlorides in moderate quantity. Convalescence was soon declared.

CASE 2. The patient was admitted on the 7th day of the disease. The physical signs denoted solidification of the lower lobe of the left lung. The chlorides were present in the urine in considerable quantity. On the second day after admission, there was no improvement in the symptoms, except that the respirations were somewhat less frequent. The urine was not examined on this day, nor afterwards. On the 4th day after admission there was marked improvement, and convalescence was soon declared.

CASE 3. In this case the urine was not examined until after improvement had commenced. The chlorides were then present in moderate quantity.

CASE 4. The patient on his admission (the previous duration of the disease not determined), presented physical signs denoting solidification of the upper lobe and of the upper portion of the lower lobe. The urine contained only a trace of the chlorides. No farther examination of the urine was made. Delirium tremens became developed, and death took place on the 9th day after admission.

CASE 5. On the second day after admission (previous duration of the disease not determined), the physical signs showed solidification of the upper lobe of the right lung. The chlorides were present in the urine in moderate quantity. On the 4th day after admission improvement had taken place, and the chlorides were still present in the urine in moderate quantity. The improvement was progressive, and the urine continued to contain the chlorides.

CASE 6. The patient was admitted on the 12th day of the disease. The physical signs showed complete solidification of the upper lobe of the right lung, and incomplete solidification of the lower lobe. The chlorides were present in the urine in moderate quantity. On the 3d day after admission, the urine did not contain a trace of the chlorides. No improvement had occurred, as shown either by the symptoms or signs. On the 4th day, the patient's condition was improved. The urine was not examined. On the 5th day delirium tremens became developed, but the physical signs showed that the lung was undergoing resolution. The chlorides were abundant in the urine on this day. Death took place on the 7th day after admission.

CASE 7. The urine was not examined until after the improvement was manifest. It then contained the chlorides.

CASE 8. On the day of admission into hospital, the 8th day of the disease, the signs showed solidification of the lower lobe of the right lung. On the second day after admission, the signs showed an extension of the affection to the upper lobe of the same lung. At this time the chlorides were present in the urine in moderate quantity. On the 3d day after admission, solidification of the upper lobe had taken place. The chlorides

were present in the urine in considerable quantity. Pericarditis was ascertained to exist on this day by the physical signs. On the 8th day the chlorides were abundant. The patient recovered, the inflammation of the upper lobe eventuating in abscess.

CASE 9. The patient was admitted into hospital with pneumonia and delirium tremens, the previous duration of the pneumonia not determined. On the second day after admission, the physical signs showed solidification of a portion of the lower lobe of the right lung. On the 3d day the solidification had extended over the lobe, and was more complete than on the preceding day. The chlorides were present in the urine in moderate quantity. Death took place on the 4th day, and on post-mortem examination the whole of the lower lobe of the right lung was to be found solidified, and the upper lobe of the same lung was in the first stage of pneumonia.

CASE 10. On the 4th day after admission, the physical signs in the morning showed commencing solidification of the upper lobe of the right lung. The chlorides were then present abundantly in the urine. At evening of the same day, the physical signs showed advanced solidification of the affected lobe. The following note was appended to the record of that day: "This patient entered while the pneumonic solidification of the lower lobe of the right lung was undergoing resolution. The pneumonia has attacked the upper lobe of the right lung after his admission, and is now advancing over that lobe, notwithstanding the abundance of chlorides in the urine." On the 5th day the solidification had extended over the upper lobe, and the chlorides in the urine were still abundant. The patient recovered.

CASE 11. On the 2d day after admission in the morning, the physical signs showed solidification of the lower, but not of the upper lobe of the left lung. In the evening of the same day, the signs showed commencing solidification of the upper lobe. The chlorides were abundant in the urine on the morning of this day. The following is quoted from the record on that day: "On an examination of the urine this morning, the chlorides were present in abundance; and in the mean time (evening), the pneumonic solidification has advanced so rapidly, that the breathing over the upper lobe, which this morning was vesicular, although feeble, has become, in 8 hours, intensely bronchial." On the 3d day there was some improvement in the symptoms. The chlorides were still present in abundance. On the 4th day improvement more marked, and the chlorides were abundant. On the 6th day the improvement continued, the chlorides still abundant. The patient recovered.

The facts contained in these cases show that the chlorides may disappear from the urine while the local affection is advancing, and reappear in the urine after the affection has reached the limit of its advancement, and resolution has commenced. Cases 1 and 6 warrant this conclusion. Case 4 showed a marked diminution of the chlorides (a trace only being present), probably under the circumstances just stated. Cases 8, 9, 10 and 11, however, show that the chlorides may be present in the urine while the inflammatory exudation is rapidly going on. It is to be remarked that in all these cases the advancement of the disease was in a lobe attacked

secondarily, and while resolution may have begun in the lobe previously affected. Perhaps further observations will show that, under these circumstances, the chlorides may be present exceptionally to a rule of their absence during the advancement of the local affection.

Judging from these facts, we can only say that the absence of the chlorides may be considered as evidence that the exudation is going on; but the presence of the chlorides does not constitute conclusive evidence that exudation is not going on. A large series of observations in which the presence or absence of the chlorides is noted in connection with the condition of the lungs as denoted by the physical signs, as well as symptoms, is a desideratum.

Cases 2, 3, 5 and 7, only show the presence of the chlorides during the progress of the resolution of pneumonia.

ART. II.—*On Uræmic Intoxication.* By WILLIAM A. HAMMOND, M. D.,
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WHEN we consider how important a part the kidneys fulfil in depurating the blood, we can readily believe that any serious interruption to the due performance of their function must be attended by great disturbance in the healthy action of the other organs of the economy. We find that such is actually the case. Physiological experiments, together with many well-established cases of disease, have taught us that suppression of the urinary excretion is one of the most dangerous events that can happen in the whole range of pathological occurrences.

In the present memoir, I propose to consider the subject of uræmia, or that condition of system due to the accumulation in the blood of matters which in health are removed by the kidneys, basing what I have to say mainly upon my own investigations.

When the renal arteries of an animal—as, for instance, a dog—are ligated, or the kidneys removed, death ensues in from two to four days generally, though occasionally life is retained for a longer period. In one of my own experiments, the animal, a small dog, lived for twelve days; and Marchand¹ mentions a case in which a sheep lived for nearly a fortnight after removal of the organs in question.

At first, the animal upon which this operation has been performed does not appear to be seriously inconvenienced thereby. It eats, sleeps, and follows its other instincts with but little irregularity. After a variable

¹ De l'existence de l'urée dans les parties de l'organisme animal, autres que l'urine. *L'Experience* 1839, t. ii. p. 43.